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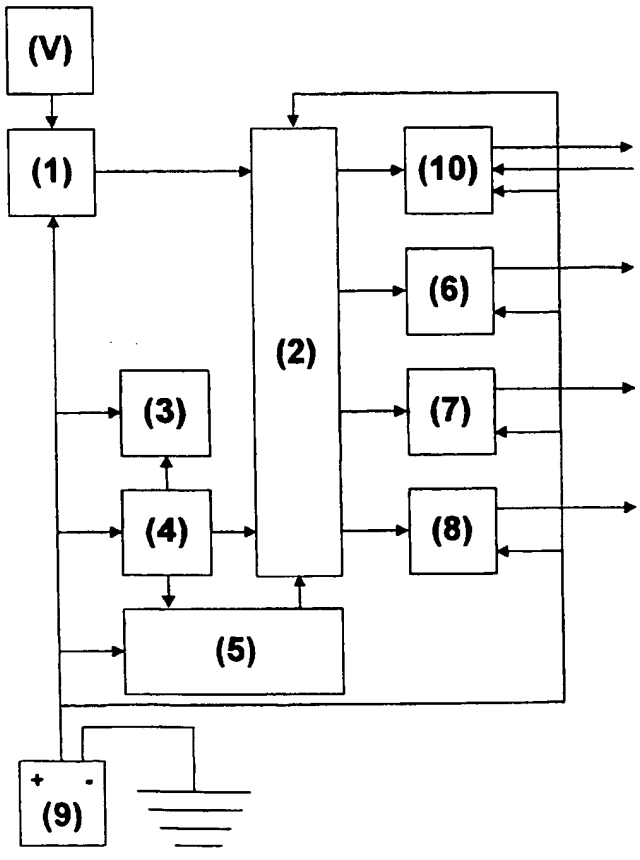
(54) Title: SPEED CONTROLLER AND LIMITER, WITH ANTI-THEFT DEVICE, FOR AUTOMOTIVE VEHICLES



(57) Abstract: Speed controller and limiter, with anti-theft device, for automotive vehicles, refers to an electronic device for controlling and limiting the displacement speed, with anti-theft, to be applied in automotive vehicles. It has the purpose of emitting a visual or sonorous internal alarm, and/or to limit the speed of displacement of the vehicle when a selected speed be reached. The device is composed of Integrated Circuit (2), and it will have a panel composed of numeric keyboard (4) and display (3) for choice of the displacement speed, which, in case of starting the "limiter" function, won't allow that the vehicle surpasses a speed above that selected, using its motive power. This device aims to popularize the use of the effective speed control, as its simplicity and low cost allow the driver to drive with larger safety, avoiding fines for excess of speed, minimizing the possibility of accidents with material and human damages and insurance costs, saving fuel, avoiding the theft of the vehicle, and avoiding larger vehicle's depreciation and maintenance expenses.

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" SPEED CONTROLLER AND LIMITER, WITH ANTI-THEFT DEVICE, FOR AUTOMOTIVE VEHICLES".

The present Patent of Invention refers to an electronic device for controlling and limiting the displacement speed, with anti-theft, to be applied in automotive vehicles. It has the purpose of emitting a visual or sonorous internal alarm, and/or to limit the speed of displacement of the vehicle when a selected speed be reached. The device is composed of Integrated Circuit, and it will have a panel composed of numeric keyboard and display for choice of the displacement speed, which, in case of starting the " limiter " function, won't allow that the vehicle surpasses a speed above that selected, using its motive power. The function " limiter " can also be started with protection through a password (such password being optionally changed by the user), in case the vehicle is given to a driver not possessing the password, and it will allow to limit the speed of the vehicle to a safe value, according to legal criterions or that criterions of the vehicle's proprietor or responsible (carrier of the password), in so avoiding fines and/or accidents for excess of speed. It can also be used as an anti-theft device, because it has a circuit that, when being activated through password, inhibits the vehicle's motor operation, by blocking its ignition, in vehicles with carburetor, or by returning to the slow gear for the vehicles with electronic injection, besides predisposing for operation the temporized, sonorous, and visual external alarms, in case of attempt of finding the unblocking password and/or placing the vehicle in movement. This device aims to popularize the use of the effective speed control, as its simplicity and low cost allow the driver to drive with larger safety, avoiding fines for excess of speed, minimizing the possibility of accidents with material and human damages and insurance costs, saving fuel, avoiding the theft of the vehicle, and avoiding larger vehicle's depreciation and maintenance expenses.

As it is well known by the technical means linked to the production of devices for control of automotive vehicles, nowadays the following devices for speed control exist:

A) Tachograph , that, when being installed together with the vehicle's speedometer, registers in a circular paper card the velocity versus time. This device doesn't directly control the increase and decrease of the speed, because it only registers the speeds occurred from the beginning to the end of its course or of the card's cycle.

B) Mechanical speed control device, installed together with the speedometer and endowed with a metallic stem, which, on being surpassed the predefined speed limit, overlays the speedometer pointer, indicating the surpassing of the speed limit. This device also doesn't directly control the increase and decrease of speed of the vehicle and it presents as disadvantages:

B 1) the demand of a lot of attention on the part of the driver to the speedometer, sharing his attention with the traffic and making his job much more stressing,

B 2) The non-filling of speed excesses, committed after having surpassed the speed limit for the first time.

C) Electronic speed control device based on an electronic sensor coupled to the vehicle's speedometer, which works a sound alarm for a certain time when the preset speed is overcome, and, after having surpassed that time, works an electromechanical totalizer and increases the counting in one unit Giving the sum, at the end of a period (trip or stage), of how many units were computed. This device, although it has implemented novelties on the mechanical device, also doesn't directly control the increase and decrease of the speed, and has its use limited to indicate the occurrence of an excess of a predetermined speed, without acting on the increase or decrease of the same.

D) Electronic device controlling the vehicle's variables: excess of speed, traveled distance, stops and duration, rotation excess, out-of-gear drives, low pressure of the motor oil, abrupt braking, excess of motor temperature, low alternator load, connection and number of the towed cart, tires pressure, number of passengers, drivers and collectors identification and report of the last two minutes, activated after an abrupt braking. This device is extremely complex and of high cost, adequate for bus and trucks fleet owners, and it also doesn't act on the increase and decrease of the vehicle speed to maintain a predetermined speed.

" SPEED CONTROLLER AND LIMITER, WITH ANTI-THEFT DEVICE, FOR AUTOMOTIVE VEHICLES", the object of the present patent, was developed to give a new alternative to the owners of automotive vehicles for the speed control of the vehicles, being an electronic speed controller and limiter device, with anti-theft, to be applied in automotive vehicles. It has the purpose of emitting an internal visual and/or sonorous alarm, and/or to limit the speed of displacement of the vehicle, when a selected speed is reached. It is composed of an dedicated integrated circuit in one of the versions, and of discreet Integrated Circuits in another, being endowed with a panel with a numeric keyboard and a display for choice of the displacement speed, which, in case of putting the key " limiter " on, won't allow that the vehicle surpasses a speed above the selected one, using its motive power. The function " limiter " can also be put to work with protection by password (optionally changeable by the user) in case the vehicle is given to a driver that doesn't have the password, and it will allow to limit the speed of the vehicle to a safe value, according to the criterions of the vehicle's user (password owner), or according to legal criterions, in so avoiding accidents and fines for excess of speed. The data collection of the displacement speed in vehicles with a conventional speedometer (endowed with induction motor), is obtained through a transducer to be installed in its panel, and in the vehicles with

electronic speedometer, through pulses collected in its speedometer. The device can also be used as an anti-theft, because it possesses a circuit that, when being activated through the function " anti-theft " and through the introduction of the password, inhibits the operation of the vehicle's motor by blocking its ignition, in vehicles with carburetor, or by returning to the slow gear for the vehicles with electronic injection, besides predisposing for operation the external temporized sonorous and/or visual alarm, in case of attempting to find the unblocking password and/or to place the vehicle in movement. This device aims to popularize the use of the effective control of speed, because its simplicity and low cost allow the driver to drive with larger safety, avoiding fines for excess of speed, minimizing the possibility of accidents with material and human damages and the insurance costs, saving fuel, avoiding the theft of the vehicle, avoiding larger depreciation of the vehicle and larger expenses with the maintenance of the same. For a better understanding of the present invention, the FIGURE 1 is enclosed, that shows the Block Diagram of the components of the device of the present patent. According to the referred figure, the speed controller and limiter is constituted by the analogic/digital sensor (1), unilaterally linked to an electronic speedometer (V) electronic, or through a transducer to a mechanical speedometer, to an integrated circuit (2), and to a source of energy (9). The integrated circuit (2), dedicated or discreet, contains firmware designed to receive the information of reference speed (VR) and password habilitation/disablement through the keyboard (4), to receive information of the instantaneous speed (VM) through the sensor (1), to process comparison among (VM) and (VR) and to send signal to the internal sonorous/visual signalizing module (7), and, in case the function " limiter " is enabled, also to send signal to the ignition blocking module (6) or to the of injection control interface (10), and, if it is the case, to the external timing and sonorous/visual signalizing module (8).

The integrated circuit (2) is unilaterally linked to the sensor (1), to the keyboard (4), to the module of memory (5), to the ignition blocking module (6), to the internal sonorous/visual signalizing module (7), to the external timing and sonorous/visual signalizing module (8), to the source of energy (9) and to the injection control interface (10). The display (3) is unilaterally linked to the keyboard (4) and to the source of energy (9). The keyboard (4) is composed by ten numeric keys and by function keys, and, as example, will have the following functions:

a) Key for introduction of the Reference Speed value (VR) - with green led,

b) " Limiter " key - with yellow led (intermittent, after the password habilitation),

c) " Reset " key - to eliminate the data in (VR) in the comparing circuit inside of IC (2), when the password is disabled, and also the function of disabling the password after the same have been redigitized,

d) " Enter " key - to enable the password,

e) " Anti-theft " key (AF) - with red led (intermittent, after the password habilitation).

The keyboard (4), is unilaterally linked to the integrated circuit (2), to the. display (3), to the module of memory (5) and to the source of energy (9). The module of memory (5), is composed by RAM memories type 6264 or equivalent, or EEPROM, and it has the purpose of storing the password (resident password and inserted password) for posterior comparison inside of the circuit (2), and it is unilaterally linked to the integrated circuit (2), to the keyboard (4) and to the source of energy (9). The ignition blocking module (6), contains a driver composed by transistor TIP 31 or equivalent, and a relay with contacts that support the electric current of the vehicle's ignition system, and is unilaterally linked to the integrated circuit (2) and to the source of energy (9). The internal sonorous/visual signalizing module (7) contains a led and a " Sonalert " or

equivalent sonorous signalizing device, and is unilaterally linked to the integrated circuit (2) and to the source of energy (9). The external timing and sonorous/visual signalizing module (8) contains a driver composed by transistor TIP 31 or equivalent and by a relay with contacts that support the electric current of the vehicle's external signalizing lamps and of the external sound signalizing device (siren type), and is unilaterally linked to the integrated circuit (2) and to the source of energy (9). The source of energy (9) is composed by the own vehicle's battery (12 V DC automotive battery), and is unilaterally linked to the sensor (1), to the integrated circuit (2), to the display (3), to the keyboard (4), to the module of memory (5), to the ignition blocking module (6), to the internal sonorous/visual signalizing module (7), to the external timing and sonorous/visual signalizing module (8) and to the injection control interface (10). The injection control interface (10) receives a signal indicating the position of the opening of the butterfly valve that controls the dosing of the air/combustible mixture, and sends it back to the vehicle's electronic injection (IE), but when the speed limits is surpassed the signal sent back to the electronic injection (IE) will be that of slow gear, coming back to the normal operation as soon as the vehicle reachs the predetermined speed or the key " reset " is pressed. The injection control interface (10) is constituted of a LM324 or equivalent integrated circuit, a BC108 or equivalent transistor, a relay for 12 V DC with reversible contacts (or electronic keying circuit, integrated or discreet), a resistive tension divider, and is unilaterally linked to the integrated circuit (2) and to the source of energy (9), and bilaterally linked to the electronic injection (IE).

The mechanism of operation of the device of the present patent works in the following way:

When the user inserts through the keyboard (4) the value of the reference speed (VR) this is sent to the comparing circuit of the integrated circuit (2). The sensor

1) obtains the instantaneous speed data (VM) by analyzing the information collected in the " transducer " coupled to the mechanical speedometer (V), or the pulses train that commands the electronic speedometer being also this signal sent to the comparing circuit inside the integrated circuit (2) for the due processing. The integrated circuit (2) will make then the comparison among (VM) and (VR). If (VM) > (VR) it will send a command signal to the internal alarm (7). If the " limiter " function is on, the internal alarm will sound and there will be the blocking of the ignition through the relay (6) for vehicles with carburetor, and return to slow gear in vehicles with electronic injection, through the injection control interface (10). Once introduced the password, the reference speed (VR) can be only altered with the disabling of the same password. When the speed drops to a value lower than (VR), [(VR) minus histeresis of the circuit], so the internal alarm as the limiting function will be temporarily disabled, until that happens again the case of (VM) > (VR). If (VM) is smaller or equal to (VR) the device won't enter in operation. If the " reset " function is started, and the password is disabled, (VR) data will be removed of the comparing circuit, and the vehicle can start to work without the intervention of the device.

The " anti-theft " can be activated in two ways:

1) pressing the " anti-theft " key and typing the password. This way it will happen the cutting of the energy supply to the relay (6), and the external timing and signalizing device (8) will be triggered to work on in case there is an attempt of starting the motor of the vehicle without the typing of the password for disabling the same.

2) defining (VR) as zero, starting the " limiter " function and introducing the protection password. This way an electronic key will be enabled by this condition and it will place the external timing and signalizing device (8) and the relay (6) of the device ready to receive a signal from the comparing circuit in the Integrated

Circuit (2), and said signal will occurs when somebody tries to move the vehicle without typing the disabling signal; the motor will work but it will turn off as soon as the vehicle move and the external timed alarm (8) will function.

The habilitation and disabling of the password, as an example, can happen in the following way:

Habilitation of the password: typing the corresponding numbers and, soon after, the " enter " key.

Disabling of the password: typing the corresponding numbers and, soon after, the " reset " key.

The device object of the present patent, allows activating only the internal sound alarm, or only the limiter, or both; It also allows that the sound alarm alerts the driver that the displacement speed is close to the predetermined speed limit when the " limiter " is activated.

CLAIM

1 " SPEED CONTROLLER AND LIMITER, WITH ANTI-THEFT DEVICE, FOR AUTOMOTIVE VEHICLES", characterized by, analogic/digital sensor (1), unilaterally linked to an electronic speedometer (V) electronic, or through a transducer to a mechanical speedometer, to an integrated circuit (2), and to a source of energy (9), integrated circuit (2), dedicated or discreet, that contains firmware designed to receive the information of reference speed (VR) and password habilitation/disablement through the keyboard (4), to receive information of the instantaneous speed (VM) through the sensor (1), to process comparison among (VM) and (VR) and to send signal to the internal sonorous/visual signalizing module (7), and, in case the function " limiter " is enabled, also to send signal to the ignition blocking module (6) or to the of injection control interface (10), and, if it is the case, to the external timing and sonorous/visual signalizing module (8), said integrated circuit (2) being unilaterally linked to the sensor (1), to the keyboard (4), to the module of memory (5), to the ignition blocking module (6), to the internal sonorous/visual signalizing module (7), to the external timing and sonorous/visual signalizing module (8), to the source of energy (9) and to the injection control interface (10), display (3) unilaterally linked to the keyboard (4) and to the source of energy (9), keyboard (4) composed by ten numeric keys and by function keys, and unilaterally linked to the integrated circuit (2), to the display (3), to the module of memory (5) and to the source of energy (9). The module of memory (5), composed by RAM memories type 6264 or equivalent, or EEPROM, and unilaterally linked to the integrated circuit (2), to the keyboard (4) and to the source of energy (9), ignition blocking module (6), containing a driver

composed by transistor TIP 31 or equivalent, and a relay with contacts that support the electric current of the vehicle's ignition system, and unilaterally linked to the integrated circuit (2) and to the source of energy (9), internal sonorous/visual signalizing module (7) containing a led and a " Sonalert " or equivalent sonorous signalizing device, and unilaterally linked to the integrated circuit (2) and to the source of energy (9), external timing and sonorous/visual signalizing module (8) containing a driver composed by transistor TIP 31 or equivalent and by a relay with contacts that support the electric current of the vehicle's external signalizing lamps and of the external sound signalizing device (siren type), and unilaterally linked to the integrated circuit (2) and to the source of energy (9), source of energy (9) composed by 12 V DC automotive battery, and unilaterally linked to the sensor (1), to the integrated circuit (2), to the display (3), to the keyboard (4), to the module of memory (5), to the ignition blocking module (6), to the internal sonorous/visual signalizing module (7), to the external timing and sonorous/visual signalizing module (8) and to the injection control interface (10), and injection control interface (10) composed by a LM324 or equivalent integrated circuit, a BC108 or equivalent transistor, a relay for 12 V DC with reversible contacts (or electronic keying circuit, integrated or discreet), a resistive tension divider, and unilaterally linked to the integrated circuit (2) and to the source of energy (9), and bilaterally linked to the electronic injection (IE).

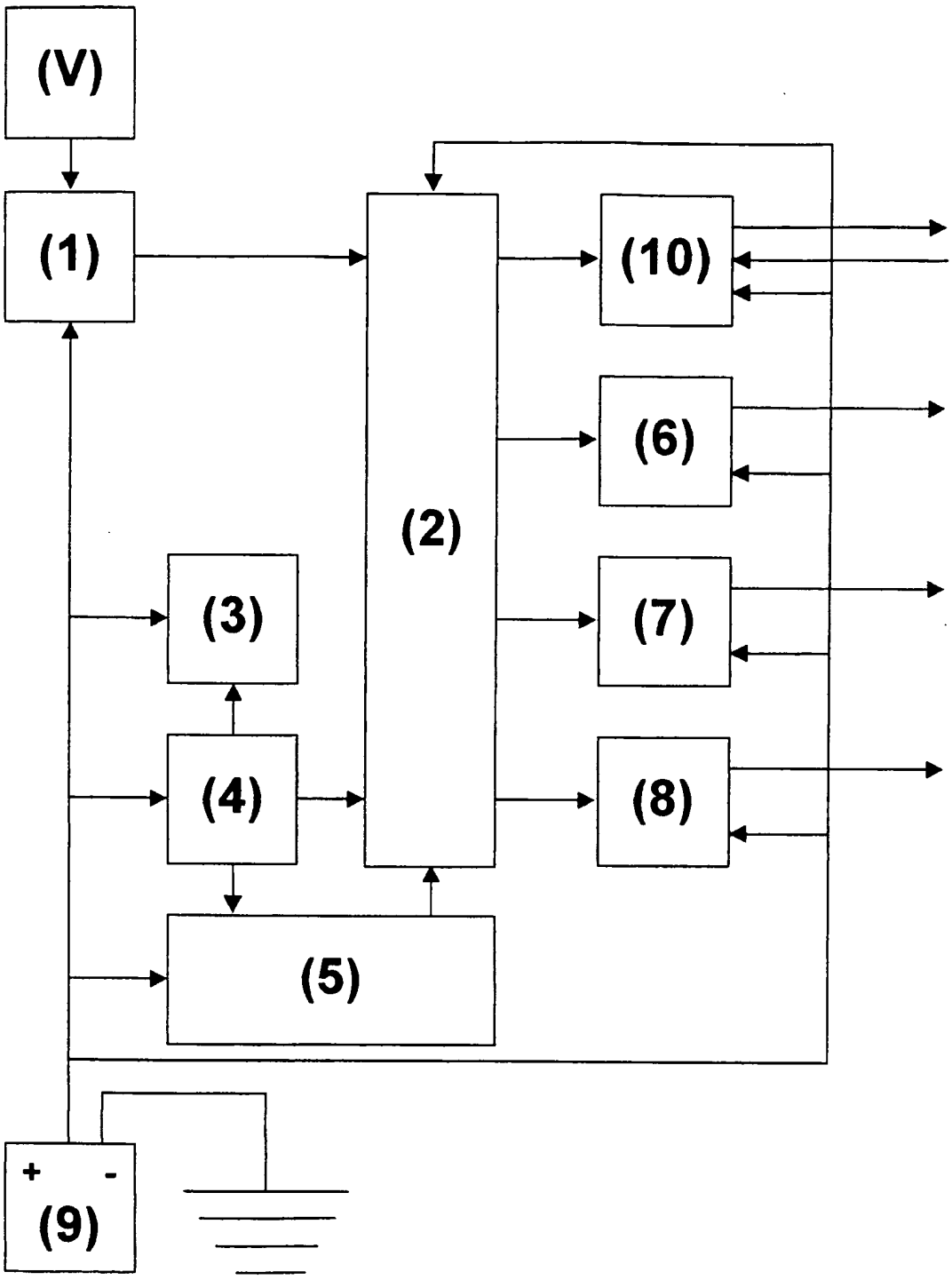

FIGURE 1

INTERNATIONAL SEARCH REPORT

Int. ional Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60R25/04 B60K31/16 B60R25/10 B60K31/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B60R B60K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CA 2 187 677 C (PAVICIC VLADO ;MARKOVIC DRAGAN (CA); PAVICIC LILIANA (CA)) 11 April 1998 (1998-04-11) the whole document	1
A	EP 0 754 606 A (FUJITSU TEN LTD) 22 January 1997 (1997-01-22) column 4, line 11 - line 15	1
A	EP 0 624 488 A (BERRA MASSIMO GIANCARLO) 17 November 1994 (1994-11-17) column 4, line 8 - line 49 column 5, line 33 - line 41	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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